BIOBIO
Indicators for biodiversity in organic and low-input farming systems

Work Package 5
Exploratory case studies in ICPC

Deliverable 5.1 Report on the stakeholder requirements in the three ICPC case study regions (Ukraine, Tunisia and Uganda)

Kainz, M.[1], Wolfrum, S.[1] (Editors), Andrijetz, A[2], Dyman, T. N.[2], Garchi S.[3], Gomiero, T.[4], Kwikiriza, N. [5], Moreno, G.[6], Nkwiine, C.[5], Opio, J. [5], Sghaier, T.[3], Siebrecht, N.[1] and Yashchenko, S.[2]

[1](TUM) Technical University of Munich, Germany, [2](BTNAU) Bila Tserkva National Agrarian University, Bila Tserkva, Ukraine, [3](INRGREF) Institut National de Recherches en Génie Rural Eaux et Forêt, Tunis, Tunisia, [4](UP) Department of Biology, Padova University, Italy; [5](MAKARERE) Soil Science Department, Makerere University, Kampala, Uganda; [6](UEX) Forestry School, University of Extremadura, Plasencia, Spain,

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INHALT

1. SUMMARY

Beside assessing biodiversity on farms in Europe, BioBio researched the possibility to indicate biodiversity in three International Cooperation Countries (ICP countries) of the European Union: Ukraine, Tunisia, Uganda. Local stakeholder groups were involved in the discussion about the applicability of the European biodiversity indicators defined by BioBio to the ICP countries.
The stakeholder involvement differed in depth between the three counties. Especially in Uganda, farmers were very enthusiastic about the BioBio work and the focus on biodiversity. They attended focus group discussions that were not part of the original research contract (DOW) but which were arranged during the BioBio research and can be seen as an outstanding involvement of stakeholders in the BioBio process.
In all ICP countries biodiversity is recognized as important, and the BioBio indicators seem to be straightforward. The BioBio indicator "earthworm species" seemed particularly attractive, which reflects the importance of those animals for tilling the soil and crop production as well as the interest for "hidden" elements of nature.
All participants are interested to gain more information about BioBio results and are willing to support future research – except for investing money.

2. GENERAL INTRODUCTION

BIOBIO is a European project, which aimed at the conceptualization of criteria for a scientifically based selection of biodiversity indicators for organic and low-input farming systems. In a first phase, candidate biodiversity indicators were tested in representative case studies across Europe. In a second phase, the applicability and usefulness of the resulting indicator set was tested in three International Cooperation Partner Countries (ICPC;, Ukraine, Uganda, Tunisia). The main output of the BIOBIO project consists of guidelines for the implementation of 23 biodiversity indicators for organic and low-input farming systems for Europe (Herzog et al. 2012).

Organic and low-input farming systems have been shown to benefit farmland biodiversity although a generic indicator system to assess these benefits at the European level is lacking. The BIOBIO project therefore pursued the following objectives:

- Conceptualization of criteria for a scientifically-based selection of biodiversity indicators for organic/low-input farming systems in Europe (Work Package WP2) and beyond (WP2, WP5);
- Assessment and validation of a set of candidate biodiversity indicators in representative case studies across Europe (WP3) and in ICPC countries (WP5);
- Preparation of guidelines for the implementation of biodiversity indicators for organic/low-input farming systems for Europe and beyond (WP6).

Existing indirect farm management indicators as well as direct indicators for genetic, species and habitat diversity were assessed for their scientific soundness, practicality, geographic scope and usefulness for stakeholders. Candidate indicators were tested in a standardised design in twelve case studies across Europe (WP3). Based on the experience from the European case studies, they were then tested in three ICPC countries (WP5). Stakeholders (farming communities, conservation NGOs, administrators) were integrated (Pointereau 2009) at critical stages of the indicator selection process (WP7, WP5: this report). A handbook with factsheets was produced for validated indicators (WP2, WP6; Herzog et al. 2012) together with a sampling design for biodiversity monitoring in organic and low-input farming systems across Europe and beyond (WP2) (Dennis 2009, 2010).

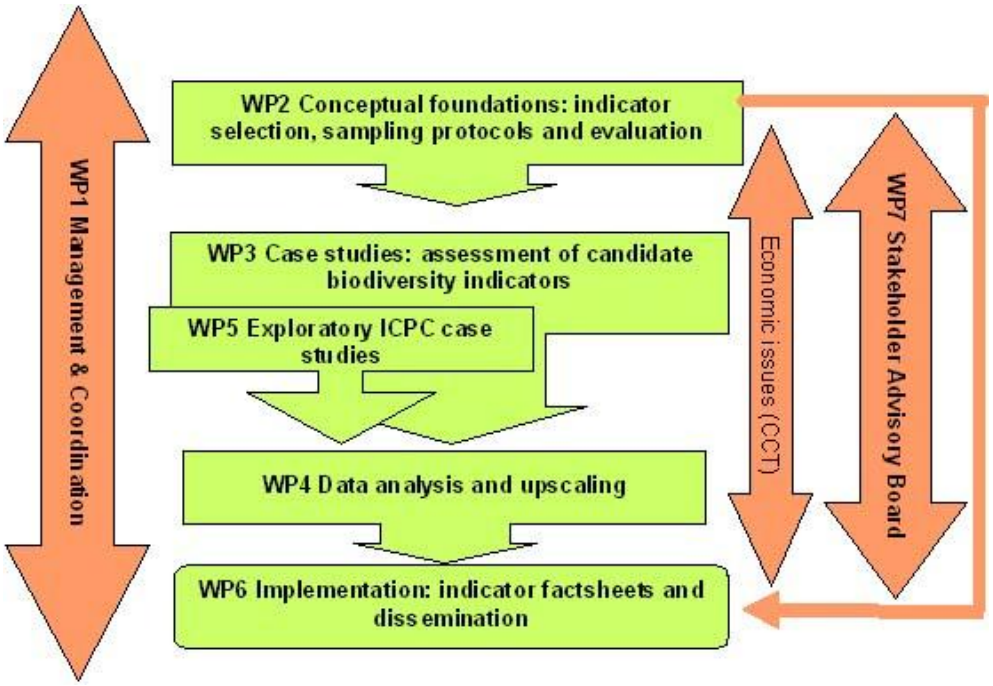


Fig. 1: BioBio objectives and work packages.

This report gives an overview about the stakeholder involvement in the ICPC case studies in Uganda, Ukraine and Tunisia (WP5).

Table 1: Description of the farming systems and the farms in the ICPC case studies

Country	Farming system	No. of farms	Average farm size
Tunisia	Olive groves	10 organic & 10 conventional	74 ha (most area: less than 30 ha)
Ukraine	Mixed arable & livestock	3 low input & 3 high input	2626 ha
Uganda	Small holders' arable farming	8 organic & 8 conventional	0.42 ha

3. BioBio Stakeholder involvement in ICPC case studies

As in the European case studies, local stakeholder groups accompanied the research conducted in the ICP countries.
Local stakeholder groups were constituted, consisting of farmers' representatives, conservation NGOs and local administrations. Information about BioBio was made available in the national languages. The local ICPC partners report on the stakeholder involvment, and the WP leader collated this information.

3.1. Stakeholder meeting in Ukraine

On March, 5th 2012 a meeting with case study farmers was held at Bila Tserkva National Agrarian University. Representatives of Bila Tserkva District Agrarian Department attended the meeting (Table 2).

Table 2: Participants in the Ukrainian stakeholder meeting.

Stakeholder group	**Name of Organization**
Farmers	
Nicholas Yakymets Andriy Yemets (agronomist)	Co.Ltd "Stschors", village Yablunivka
Michael Voytovyk	Co. Ltd "Mriya", village Bloschyntsi
Peter Kuzmenko Sergei Obrazhey (agronomist)	Bila Tserkva University training farm
Valentina Danilenko	Co. Ltd „Agrosvit" village Karapyshi
Anatoly Sidorchenko Valentin Sheyda (agronomist)	Co. Ltd "Agrofirm Matyushi", village Matyushi
Administration & Public Authorities	
Vitaly Hrinchuk Vladimir Sentsov	Bila Tserkva District Agrarian Department

The project manager in Ukraine, Tetyana Dyman, reported the results of field, laboratory and taxonomic research found within the project. Initially, maps of all farms prepared with the software "Quantum GIS" were presented, allowing to compare the agricultural habitat diversity, areas of cultivated land and to assess the proportion of semi-natural habitats on each farm.
Then farmers were informed about quantitative and qualitative indicators for all BioBio species indicators (plants, earthworms, spiders, bees). Each farmer received tables with numbers of collected species and total specimen per m^2 in each of 10 types of habitats of all surveyed farms. The number of earthworms raised the greatest interest amongst the farmers.
The best results on biodiversity preservation were recognized at the agricultural community "Mriya" (village Bloschyntsi) where tillage technology 'No-till' has been practiced since 5 years.
All farmers participated in discussions concerning best agricultural practices for biodiversity preservation. They noted the importance of semi-natural habitats, which serve as reserves for the species, reducing of frequency and timing of field operations, increasing area of land without use of mineral-based fertilizers and pesticides. They also noted that State agrarian policy now does not promote activities for biodiversity conservation. Many farmers do not see the financial benefits of this activity.
All farmers recognized the results of the project as useful for themselves and wanted to have the information about farm biodiversity annually. They are ready to provide full cooperation and assistance, except financial, for such research on their farms.
The specialists of the District Agrarian Department will inform all managers of agrarian companies in Bila Tserkva region on the project results.

3.2. Stakeholder meeting in Tunisia

On April, 13th 2012 a meeting with case study farmers and advisors was held at Monastir.

Table 3: Participants in the Tunisian stakeholder meeting.

Owners of the farms of the area of Monastir	10 farmers
Owners of the farms of the area of Mahdia	5 farmers
Mili Faycel	Agricultural cell of advisory service of Jemmal, Monastir
Garchi Salah Ammari Youssef	BioBio Project (INRGREF)

The discussion started with the definition of "Low Input" and "Organic farming", the presentation of the indicators used in BioBio and of the selected farms. The biodiversity indicators developed for organic and low input farming systems were evoked one by one. The discussion was focused on the role of the selected indicators and their impacts on the farmers' work.

The application of the indicators in arid Tunisia is tributary primarily of the climatic conditions. Indeed, during the rainy years, herbaceous plants are well developed and the annual species cover the ground of Tunisian olive plantations. Therefore, in the plantations many species of flowers will be found during spring. Depending on the flowering species many bees and the spiders can expected.
In addition, it was remarked that during a rainy year earthworms could be found at a low depth in the ground. The vegetation is the principal component that supports or disadvantages the existence of bees and the spiders. The two indicators (bees and spiders) are tributary of the vegetation, which remains also tributary of the rain.
Farmers were interested in the results and recognized the results of the project as useful for themselves. They are ready to provide cooperation for such research on their farms.

3.3. Stakeholder meeting in Uganda

Table 4 summarizes the stakeholders in the Ugandan case study, and it represents their level of importance and involvement in the BIOBIO Project.

Table 4: Ugandan stakeholders in the BioBio project.

Stakeholder group	**Nature of interest in the project**	**Impact on the project**	**Relative importance of interest**	**Impor-tance of group**	**Influence (power) of group**
1° Stakeholders					
Organic farmers	Enhancing organic production practices	High	High	High	High
Conventional farmers	Learning researchers to improve production	High	Medium	High	High
Researchers	Coming up with Bio Bio indicators	High	High	High	High
2° Stakeholders					
Makerere University	Research and knowledge in Biodiversity studies Capacity Building for institutions' scientists	High	Medium	Medium	Medium
Local Government officials	Improved agricultural productivity Soil, water and environment conservation measures	Low	Medium	Low	Low
BIOBIO project member countries	Comparable BioBio indicators from the developing countries in Tropical Africa	Medium	High	High	High

Stakeholder group	Nature of interest in the project	Impact on the project	Relative importance of interest	Impor-tance of group	Influence (power) of group
3° stakeholders					
Other non-BIOBIO project member farmers	New Agricultural production knowledge	Low	Low	Low	Low
Research Institutions	New findings from the project	Low	Low	Low	Low

Organic farmers and Conventional farmers

8 organic farmers and 8 conventional farmers were selected to be part of the project. The criteria of selection used considered the selection of organic certified farmers first and used their characteristics as parallel criteria for the selection of conventional farmers (paired sampling). The most common characteristic of organic farmers used was land acreage, conventional farmers selected having relatively equal land sizes as the organic farmers. Gender balance was as well considered. This was aimed at getting a relatively similar representation from the different farmer categories. The farms were located in one Sub-county (Kayunga Sub-county) in Kayunga district and were spread in the two parishes of Nakaseeta and Nsotoka. The farmers were introduced to the purpose of the study at the commencement of the project. Two field guides were selected from farmers and it was clearly communicated to them about the purpose of the study and the need for their active and cooperative participation.
Various meetings were held with the farmers. Meetings with farmers were necessary because they were required to provide plots in which the studies were conducted. It was discovered that the BioBio studies was deeper in scope and in the involvement of the farmers than the previous studies the farmers had participated in. The study involved, for example, putting labels in the plots and spending time in the farmers' fields to determine the BioBio indicators. This required greater cooperation with the farmers, to safeguard BioBio label in the plots and to assure the farmers that the project was not targeting grabbing their land. Land grabbing had been a topical issue in the country when the BioBio project was beginning its work in the case study area. It was also very important to inform conventional farmers that they make rational decisions on what farming methods to adopt in their farm plots. This was necessary because conventional farmers had a feeling that the project was making an effort to woo them to organic farming. In carrying out the studies, the researchers ensured that they get as close to the farmers as possible. Since the study area was about 80 km from the institutions, the project rented a permanent room in the study area as a stop point for all the BioBio participants.

Researchers

The team was composed of the project team leader and the heads of sections, which included the vegetation specialist, socio-economist, earthworm specialist (doubles as the team leader), the bee specialist and habitat mapping specialist. The Uganda case study was however not able to involve athe spider specialist, and hence the spider biodiversity indicator was not assessed. Most of the research assistants recruited were university graduate and graduate students. The project was therefore very helpful in building the capacity within the institutions.
Various meetings were held to plan for the running of the activities. Important in planning was the synchronizing of the activities, so that activities got done in the proper sequences. Where necessary, activities were carried out at the same time to enable interaction between the researchers. Various adjustments were also required to align the project activities with the European case studies. It was however noted that the case study lacked enough expertise to independently carry out the studies. For example the earthworm specialist needed input from other case studies to apply the methodology for

earthworm collection and identification. This was the same case with the bee specialist. The habitat mapping specialist constantly got help from the European project members and lacked equipment for better mapping, for example to capture the aerial maps. The socio-economist was helped in the methodology of analyzing focus group discussions. The project was thus very important in building the capacity of the scientists in the project.

Makerere University Institution

The project was carried out within Makerere University, College of Agricultural and Environmental Sciences, in the School of Agricultural Sciences. The college mission is "To advance training, knowledge generation and service delivery in order to enhance agricultural development, sustainable natural resource utilization and environmental management". The project thus fits very well in the institution's vision and mission. Because of the relevancy of the project to the institution, the project was welcomed and it was able to run within the institution. As a requirement for the institution, the project ensured capacity building, knowledge generation and this is evidenced in the two paper presentations especially on the role of BioBio and the methodology of carrying out its activities. More knowledge dissemination is planned through seminars, presentations of findings and publication of the research findings. The Uganda case study also intends to improve the knowledge on biodiversity studies in including the findings in the education curriculum for both secondary schools and tertiary institutions. The major hindrance that the project met within the university was the strikes from both staff and students which substantially delayed progress in the work. There was also bureaucracy which as well led to delay in carrying out some of the BioBio activities.

Local government officials

The local Government officials were involved in the project because of their importance in ensuring the running of the project. These included the district section leaders such as the agricultural officers, environment officers and the district administration officers. Village leaders were also involved to ensure smooth running of the project and the safety of the project equipment, especially identification labels within the farmer plots. The local government officials were cooperative and the project was able to run smoothly. They were regularly invited to the BioBio meetings.

BioBio project European member countries and administration

These were very important in the running of the BioBio project in Uganda. Their importance included provision of the required logistics, monitoring and supervision of the program and the professional knowledge exchange from these countries. The BioBio project coordinator visited the Uganda case study twice, in which time he interacted with other stakeholders in the study within the country and presented papers detailing the purpose of the project and its relevance to Uganda as a beneficiary.

Non- BioBio project farmers

These were mainly in the case study area. They were important because their non-cooperation would make the work in the case study area difficult by for example destroying the BioBio labels in the plots. They were however cooperative, although they clearly showed the need to be part of the project through the informal interactions. However, this was a good indicator that more studies can be conducted in the study area.

Research Institutions

Key research institutions and extension group that were important stake holders were, the National Agriculture Research Institute (NARO), the National Agricultural Advisory Services (NAADS) and the National Agricultural Movement of Uganda (NOGAMU). These were found important in the case study area, especially in contributing to changes in biodiversity. NARO is responsible for research and introduction of new crop varieties. NAADS disseminates the new varieties and advises on farming

practices that may encourage or limit diversity and NOGAMU promotes and coordinates organic agriculture farming in Uganda.

Table 5: Summary of the stakeholder activities held in the Uganda case study

Period	Type of stake holder activity	Persons involved	Purpose of the activity
2009	Selection of the study area	-Research team -Opinion leaders	To select suitable site for the project
2009	Consultative meetings	Local leaders (district officials-local government, agricultural officers, NAADS, Environment and Natural resources officials)	To have a good working relationship with the leaders and to give a green light for the operation of the activities
2009	Focus Group discussions	-Farmers (More farmers were invited, about 50) -Local district leaders -NOGAMU (National Organic Movement of Uganda)	Inception exercise and participatory selection of participating farmers, setting yardstick of the selection
2010	Brain storm	-Selected farmers -Local district leaders -NOGAMU	To assess the suitability of the selected indicators of biodiversity to be tested in the area of study
2010	2 Focus Group Discussions	8 Conventional farmers; 8 organic farmers	To evaluate the perceptions of the different farmer categories on biodiversity
2010	Visit of the BIO BIO Project coordinator	University staff, project members, farmers	To monitor the progress of the project, knowledge sharing with other stake holders Field visit to the project areas
2011	Sharing of preliminary findings	Farmers, district leaders, University staff	To share preliminary results and suggest recommendations for sustaining Biodiversity production systems
2012	Visit of the BIO BIO Project coordinator	University staff, project members, students	To monitor the progress of the project, knowledge sharing with other stakeholders, sharing of some preliminary findings
2012, August	Presentation of findings to the farmers		

4. Focus group in Uganda

The focus group work was not planned in the DOW of BioBio, but was considered a powerful tool of stakeholder involvement. Therefore, the Ugandan BioBio participants decided to install a focus group in Kayunga district, Uganda.

Uganda is one of the tropical countries in East Africa and lies along the equator. The country depends very much on agriculture. About 80% of the population are directly or indirectly involved in Agriculture. Most of agriculture is subsistence or semi-commercial and famers grow quite a number of crops, which vary from one agro-ecological region to another. Much of the country is green and has two rainy seasons

and two dry seasons, one considered the main rain season /main dry season and the minor rain season / minor dry season.

Table 6: Main characteristics of the research area Kayunga.

General agricultural situation	Measures	Socio-economic background
Farming is done on small acreages, usually less than 1 acre, using family labor as the major labor source and the hand hoe as the major farming tool. There is both a lot of interspecific diversity and intraspecific diversity on farms. For example, a plot can have as many as 10 crops intercropped; and a single crop - for example bananas - can have as many as 8 different cultivars planted by the farmer. Usually fruit trees are part of the farm lands and although some of the fruits - for example Jack fruits - are not purposively planted by the farmers, they are protected and maintained once they establish in the fields.	There are no agri-environmental measures that exist in the study area.	The study area is in Central Uganda, about 100 km away from Kampala. The main occupation of the population is farming and only about 10% of the population are engaged in other sources of income in addition to farming. The main crops that are grown are pineapples and coffee for cash, maize, cassava, bananas, sweet potatoes, rice, beans and groundnuts mainly for food; but they are as well important sources of income.

4.1. Running the focus groups

Homogeneity of focus groups

The participants in the Focus groups, both conventional and organic farmers, were of nearly the same socio-economic status with approximately the same size of the farms. There was also little variation in the educational levels both within the focus group categories and across the categories. The focus group selection criteria included both gender and the age of the farmers. The ages ranged between 30 to 50 years except one member in the organic group who was over 70 years. All gender categories equally participated in the discussions. (In Uganda, the Ministry of Gender encourages every group or elective position to have women. This has improved their confidence in expression). Only farmers who belonged to the BioBio project were invited for the interviews. 7 conventional farmers and 8 organic farmers attended the focus group discussions.
Two aspects were found important in deciding wether a farmer turns conventional or organic. The first aspect is **the cost and the requirements** to become a certified organic farmer that limits some farmers to engage in organic farming even when they seldom use chemicals or fertilizers. Organic farmers were also **externally motivated** to get into organic farming. Companies that are involved in buying organic fruit from certified organic farmers are the ones that take a leading role in encouraging farmers to be organic. Some of the conventional farmers said that they would switch to organic farming if they were sure of the market.

Preparatory questionnaires: Back ground information of participants

All participants in both the Focus groups were born and raised in the study area except for the women who were married from other areas. Women have however settled in the study area for many years and so they understand the environment as well as the men do. The answers of the two farming groups (organic and conventional farmers) did not differ in the reasons why they liked where they lived. They appreciated the fertile soils, the good weather that enables them get good yields and the ability of their area to support a variety of both crops and trees. The ability to support crop production was however the overriding reason why the farmers liked where they lived. Another reason given by some members in each of the groups was the proximity to town to sell their produce (conventional group) and the available organic market (organic group) for their produce.

Table 7: Characteristics of the focus groups.

Research area	Place	Duration (min)	Participants	Comments
Kayunga, Uganda (Organic)	A small room in the trading centre	105	8 farmers	A very lively discussion. Farmers came in time but it was too hot inside the room.
Kayunga, Uganda (Conventional)	A small room in the trading centre	120	7 farmers	3 participants came late with one participant sending her 18 year old son to represent her.

Moderation and group dynamics

Three people conducted the focus group discussions. These were the moderator (the socio-economist on the project) and two research assistants. One research assistant was assigned the duty of recording the farmer's voices and in making notes. Another assistant was assigned the responsibility of welfare for the farmers and in assisting in explaining to farmers where they needed individual attention. A set of questions was directed to the farmers as soon as they settled at the focus group discussion venue, to which they cooperated and answered. The farmers thereafter introduced themselves indicating where they lived, a short description of their farms and why they liked where they lived. Farmers were asked to describe some photos, which were taken within their areas, stating what they see and how relevant it was to them. The exercise was exciting for both groups and in some instances arguments would arise over a disagreement of the theme being depicted in the pictures. The farmers were then introduced to the concept map. The word *biodiversity* was written in the centre of the flip chart paper. Farmers were guided to express their understanding of biodiversity. In the organic group there were a few participants who were quiet. These participants were made to participate in the exercise by particularly posing questions to them. A few questions were then asked after the map to conclude the discussions. The exercise was generally a success.

General and comparative analysis

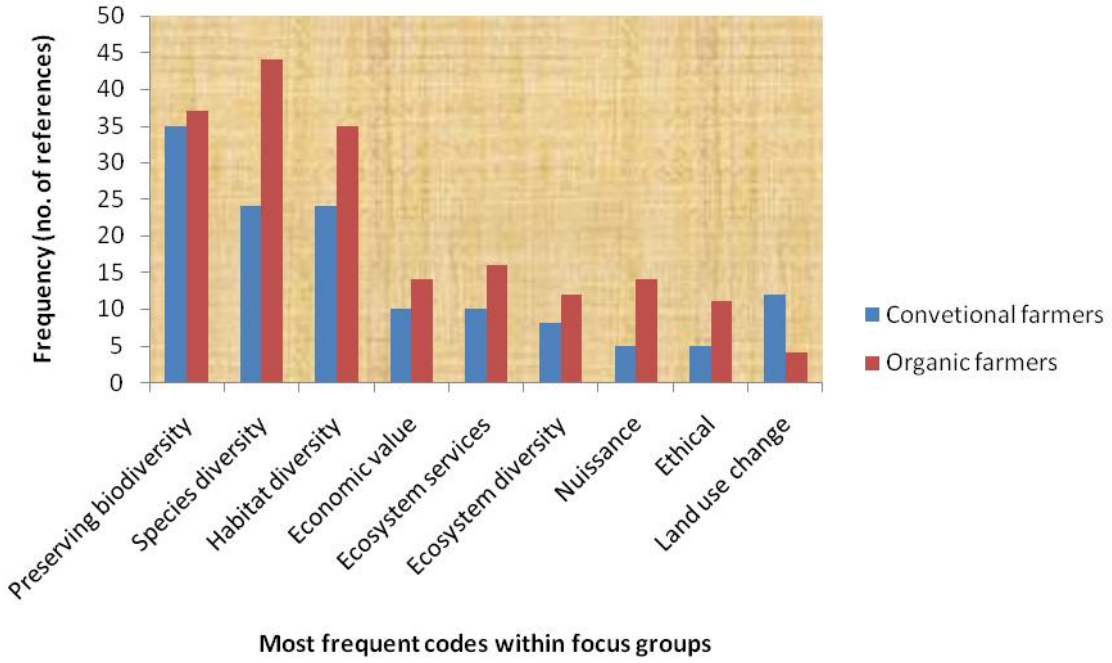
From the interpretation of the photographs and in the answering of the understanding of Biodiversity, themes were transcribed and interpreted using the NVivo software to describe biodiversity.

Table 8: Frequencies of the codes from the focus group discussions

Code to describe the meaning of Biodiversity	Conventional farmers	Organic farmers
Ethical/ social value	5	11
Preserving biodiversity	35	37
Species diversity	24	44
Agriculture intensification	0	0
Economic value	10	14
Complex systems	1	0
Naissance	5	14
Ecosystem services	10	16
Habitat diversity	24	35
Stability	1	3
Invasive species	0	0
Market effects	2	1
Ecological values	5	8
Genes diversity	1	0
Ecosystem diversity	8	12

Code to describe the meaning of Biodiversity	Conventional farmers	Organic farmers
Global society	0	0
Local community	1	4
Globalization	1	0
Broader community	2	3
Local individuals	0	3
Land use change	12	4
Climate change	13	2
Population growth	1	3

Fig. 2: Comparison of the focus groups on the frequency of the common Biodiversity codes.



From Table 8 and Fig. 1 it can be concluded:

- Codes mentioned by the organic and conventional group were similar;
- Organic focus groups used code phrases more frequently than the conventional groups;
- Nothing was mentioned concerning agricultural intensification, complex systems, invasive species, global society, gene diversity as well as globalization;
- The frequent mentioning of preserving biodiversity, species diversity and habitat diversity relates well with the rich habitat and species diversity in the study area;
- The little mention of genetic diversity implies that farmers can easily describe organisms up to species level;
- The organic group saw diversity much more than the conventional group as a nuisance mainly related to the costs involved in managing their plots to remain certified organic farmers;
- There was little global appreciation of biodiversity in all the focus groups.

Validity of results

There was bias stemming from the recruitment of participants - the discussion only included farmers of the BioBio project. We realize that the participants in the BioBio group were averagely better skilled than the rest of the community members. The organic farmers who were involved in the study were those that had previously been selected by pineapple exporters. These farmers therefore had to have sizeable land,

the minimum education and some expertise to manage the crop. These qualities could only be met by 'the average Kayunga farmers'. Conventional farmers were as well selected to compare well with the organic farmers.
There were issues related to the interpretation of the photos. The photo subjects were not interpreted as intended. Farmers could not easily comprehend the kind of biodiversity aspect the study was interested in.

4.2. Results and discussion

Picture items

Generally, both focus groups attached importance to the ecosystem of the pictures they chose. They could not easily relate the pictures to the different ways of explaining biodiversity. It can thus be concluded, that farmers use feelings rather than rational arguments when they talk about the importance of biodiversity.

Concept maps

In the Ugandan case study, the construction of the concept maps was more guided. This is because the term biodiversity could not be easily understood and literacy levels of the participants were low. When the word biodiversity was written in the centre of the chart and participants were asked to explain what they understood about it, there was no response until they were guided. The concept maps were thus constructed under the themes "evidence and indicators of biodiversity", "how biodiversity can be increased", "what reduces biodiversity" and "perceptions on diversity". In both groups, the guided discussion was lively and there were interesting responses from both the groups.

The representation of different levels of biodiversity

Species diversity was the most common level of diversity understood by farmers. Close to species diversity was habitat diversity.
Species diversity was quite much more often mentioned by the organic farmers. Statements like *"when there is biodiversity you will have many small animals on the farm like the red ants, wasps, spiders, termites and many bees" (Ug, org)* support this.
Both focus groups were much aware of the habitat diversity in the area. This was because of the different habitats that can be on the same plot of land. Statements to emphasize this included "*our area is good we have the water, the different soils which support different crops and we can grow various crops, coffee trees, bananas and beans in the same plot" (Ug- org)* or *"I enjoy where I live because it is near a town, the soils are fertile, and has a variety of crops which gives me food all year round (Conv, ug)*. The above statements also confirm that in the entire group, growing many different crops in the area was most appreciated.
Genetic diversity was not mentioned in any of the focus groups.

Attitudes towards biodiversity

Both groups had a positive attitude toward biodiversity with everybody starting his argument with the words '*it is good*', and later followed by a '*but*' for those who had a reason of being negative. There were however a lot more responses from the organic group that expressed positive attitude on biodiversity and seemed to wholesomely appreciate biodiversity as good without thinking about it critically. Both groups however pointed out that some species were important while other species were a nuisance. An example given was the ants. Whereas some ants decompose the organic matter others destroy crops, are disease vectors and others bite the farmers as they work in their gardens and as they harvest coffee and pineapples.
It can rightly be documented that even when organic farmers got into organic farming being motivated by the market factors, they have moved on to appreciate its value especially in maintaining decomposers in the soil.

Little was talked about landscape diversity by all the groups but more about the ecosystem diversity. The ecosystem diversity was much more talked about in reference to the ability to enhance crop production. They appreciated the availability of water, different soil types, different kinds of crops (perennials, annuals, fruits, vegetables etc).

Table 9: Some of the expressions on attitudes towards biodiversity from organic and conventional farmers in the Ugandan focus group.

Organic farmers	**Conventional farmers**
"If you spray you kill organisms." "If there is more diversity, crops grow well and even us people, we do not get many diseases." "Biodiversity gives us life. We want it but it also wants us." "From what we can see, biodiversity adds life to our gardens and increases our income." "When we produce, people are added in our communities and this is also diversity which is good and when the area is good people are attracted there." "Biodiversity is sometimes not good especially when you have many pests which even affect the quality of produce." "We never used to spray our crops long ago. Fertilizers and spraying are a recent phenomenon and these decrease our organisms in the soil."	"With biodiversity, you enjoy benefits from animals and crops all together on the farm." "Some ants are important but some are a nuisance. Some help our crops to grow while others destroy them." "Biodiversity improves soil fertility as each plant and animal improves soil fertility in one way or another." "We know if there are many weeds, the soil is good but weeds choke our crops and it is hard to hand pick them that's why we spray them."

4.3. Benefits and beneficiaries of biodiversity

During the focus groups participants expressed the different values they connect to biodiversity. These values can be described as following:

Emotional values

The "aesthetic value" was common in both groups, but beauty was more attached to crop productivity, fertile soils, water etc.. Statements such as, '*We like our area because we have different crops, trees and crops and our land looks green all through'* (Ug, org), *'Flowers are nice to look at. They make the environment nice'* (Ug, conv) or *'We have fertile soils that supports all crops species diversity and our land is not hilly'* (Ug, org) clearly show this value.
"Lifestyle or life philosophy" was not common in the Uganda case study but a few statements made in reference to this include *"I enjoy this place, because as a leader I find people very cooperative and friendly and so easy to lead"* (conv), *"Diversity is also good because you yourselves have come to do research if we do not have the crops you will not have what to research on"* (org) or *"Biodiversity is good because it improves the health of the people because of medicine we get from plants"* (org).
The "bequest value" was commonly mentioned in both groups. Statements in connection to this include *"Our children have never tested what we used to enjoy, for example berries and wild passion fruits which are hard to see these days"* (org), *"These days, it is hard to see snakes, monkeys and wild hares"* (org) or *"Monkeys are disappearing and our grand children may not see them"* (conv).
Statements referring to the "existence value" include *"It can be good if we are taught how to replace the diversity we have lost"* (org) or *"We need to preserve biodiversity by reducing use of chemicals like inorganic fertilizers, herbicides, and pesticides because even those who make these chemicals no longer want to eat our crops"* (conv).

Ecological values

Values from this category were not mentioned often. Participants were speaking of diversity as crops and animals enhancing each other. Statements included e. g. *"Crops and animals depend on each other. Animals will*

eat plants and plants will get the manure from the animals" (conv), *"All the organisms big and small need each other to live"* (conv) or *"Ants decompose organic matter which improves soil fertility"* (org).

Economic value

In the Uganda case study, the organic focus group mainly related the economic value to the benefits of farming organically or to having various crop types, which diversifies the household income. With the organic principles of not using fertilizers and chemicals, farmers argued that more diversity is supported and they as well get market for their produce. Another indirect argument on the economic value was the improvement of soil fertility brought about by the numerous fauna and flora which eventually supports crop production and hence increased household income. Tourism was also mentioned as a direct economic benefit of maintaining biodiversity.

The conventional group had limited response on this but they as well pointed out that biodiversity encourages various crops being planted which diversifies the household's income sources and they as well mentioned that biodiversity improves the soil that supports crop production and thus higher output and incomes. Some statements on this included: *"Biodiversity is good because it brings development as it opens up new markets"*(Ug, org) or *"Biodiversity improves soil fertility as each plant and organism improves soil in one way or another. It also ensures food security as each crop is harvested at different time of the year thus having food all the year round"* (Ug, conv).
Most of the responses pointed to the individual farmers being the beneficiaries of biodiversity. Little was mentioned about its value on the broader community or globalization except the organic group, which mentioned its importance to research.

4.4. How to preserve biodiversity

There was good response to this question from both the organic and conventional farmers. They all expressed the need to preserve biodiversity. They recognized that they had lost a number of plant and animal species. It was also pointed out by the conventional group that even when they used the chemicals, they understood that it is not good for biodiversity, as one member commented. However, the discussion clearly indicates that they used chemicals and fertilizers mainly to ease labor but are also troubled by the costs involved.
The quotation *"We need to preserve biodiversity by reducing use of chemicals like inorganic fertilizers, herbicides, and pesticides because even those who make these chemicals no longer want to eat crops on which such chemicals are used"* (Ug, conv) shows that the external forces are important in promoting organic production systems which conventional farmers strongly related to the high biodiversity. In fact, for this group, the trend of the discussion showed that biodiversity meant organic farming. The conventional group related the decline in biodiversity in addition to the use of chemical to burning, wetland reclamation and weather changes (season changes, prolonged drought, floods).
The organic group estimated that diversity could have eclined by as much as 45%. They suggested that there should be no spraying. *"These birds (eaglets) pick ticks from the cows but when cows are sprayed with chemicals, the birds do not come near our cows'* (Ug, org).
They also mentioned particular farm management practices such as mulching, planting hedges and other measures to control soil erosion, conserving wetlands, conserving wild animals, stopping bush burning or charcoal burning. The following statement expresses these thoughts *"Animals run to our wetlands for safety. If we do not conserve them, then the endangered animals will disappear"* (Ug, org).
The organic group gave various measures compared to the conventional group, and also mentioned quite a number of farm management practices which were not mentioned by the conventional group.

5. Conclusion

The stakeholder involvement differed in depth between the three counties. In all ICPC case study regions farmers appreciated the close involvement in the project and the information on the activities and results. The integration of stakeholders proofed to be valuable to commit farmers to the participation in the project and maybe even to further activities concerning biodiversity. Especially in Uganda, farmers were very enthusiastic about the BioBio work and the focus on biodiversity. The focus group discussions could

be used as a valuable tool to assess farmers' perceptions of biodiversity. This work can be seen as an outstanding involvement of stakeholders in the BioBio process.
In all ICP countries biodiversity is recognized as important, and the BioBio indicators seem to be straightforward for the stakeholders. Special interest gains the BioBio indicator "earthworm species" which reflects the importance of those animals for tilling the soil and crop production as well as the interest on "hidden" elements of nature.
As a result of the close involvement all participants are interested to gain more information about BioBio results and are willing to support future research. The findings of the stakeholder involvement support the suggestion for establishing this kind of participation as a standard for biodiversity surveys or monitoring programs in ICP countries (see Lawrence 2010).

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